

UNIVERSITY OF ILLINOIS

MECHANICAL ENGINEERING
DEPARTMENT

AN EXTENSION

...OF THE...

DEWEY
DECIMAL CLASSIFICATION

APPLIED TO

MECHANICAL ENGINEERING

...AND...

RAILWAY ENGINEERING

FOURTH EDITION

1904

Sample Card from Card Index.

624.63		
Proc. I. C. E.		The Design and Testing of Various Types of Centrifugal Fans.
423 : 272		(55 p. 34i) H. Keenan and W. Gilbert.
Dec. '95		Gives results of elaborate experiments on the efficiency of fans, and deduces characteristic curves that may be employed in the design of a fan with maximum efficiency for a given duty.

Abbreviations Used on Index Cards.

- p..... pages
- d..... diagrams, sketches, etc.
- c..... curves, plots, or groups of same
- i..... illustrations, photographs, etc.
- t..... tables of data, etc.
- w..... words

LIST OF PERIODICALS AND TRANSACTIONS

INDEXED BY THE

M. E. DEPT., UNIVERSITY OF ILLINOIS

PERIODICALS-AMERICAN.

Abbreviations.

American Electrician.....	Am Elect'n
American Engineering and Railway Journal.....	Am Engr & R R Jour
American Machinist.....	Am Mach
Cassier's Magazine.....	Cass Mag
Compressed Air.....	Com Air
Consular Reports (daily).....	Con Rep
Engineer (The) (Cleveland).....	Eng
Engineering Magazine.....	Eng Mag
Engineering and Mining Journal.....	Eng & Min Jour
Engineering News.....	Eng News
Engineering Record.....	Eng Rec
Farm Machinery.....	Farm Mach
Foundry.....	Foundry
Horseless Age.....	H Age
Ice and Refrigerator.....	Ice & Refrig
Iron Age.....	Iron Age
Locomotive (The).....	Loc
Locomotive Engineering.....	Loc Eng'g
Machinery.....	Mach
Marine Engineering.....	Marine Eng
Mines and Minerals.....	Mines & Min
Modern Machinery.....	Mod Mach
Power.....	Power
Railroad Gazette.....	R R Gaz
Railway Age.....	Ry Age
Railway and Engineering Review.....	Ry & Eng Rev
Railway Master Mechanic.....	Ry Mas Mech
Scientific American.....	Sci Am
Scientific American Supplement.....	Sci Am Sup
Sibley Journal of Engineering.....	Sib Jour Eng'g
Steam Engineering.....	Steam Eng'g
Technograph.....	Tech
Technology Quarterly.....	Tech Qr

PERIODICALS—FOREIGN.

Engineering (London).....	Eng (Lon)
Engineering Review.....	Eng Rev
Feilden's Magazine.....	F Mag
The Engineering Times (London).....	Eng Times
Zeitschrift des Vereines Deutscher Ingenieur.....	Zeit D V Ing

TRANSACTIONS—AMERICAN SOCIETIES

Journal of American Foundrymen's Association.....	Jour Am Found Ass
Journal of Association of Engineering Societies.....	Jour Assn Eng Soc
Journal of Franklin Institute.....	Jour Fr Inst
Journal of Western Society of Engineers.....	Jour W Soc Eng
Railway Club—Central.....	Cen Ry Club
Railway Club—New England... ..	N Eng Ry Club
Railway Club—New York.....	N Y Ry Club
Railway Club—Northwest.....	N W Ry Club
Railway Club—Pacific Coast.....	Pac Coast Ry Club
Railway Club—Southern and So. West	S & S W Ry Club
Railway Club—St. Louis.....	St L Ry Club
Railway Club—Western.....	W Ry Club
Trans. Am. Soc. Mechl. Eng.....	Trans A S M E
Trans. Am. Inst. Elect. Eng.....	Trans A I E E
Trans. Am. Soc. Civil Eng.....	Trans A S C E

TRANSACTIONS—FOREIGN SOCIETIES.

Proc. of Inst. of Civil Engineers	Proc I C E
Proc. of Inst. of Mechanical Engineers.....	Proc I M E

PREFACE TO THE FOURTH EDITION

DURING the last three years the third edition of the Extension of the "Dewey Decimal Classification" has been used by the Mechanical Engineering Department in the indexing of upwards of 15,000 cards: and notwithstanding the many imperfections of the extension, it has served the purpose well. In a few cases it was found that topics were not sufficiently extended. These have been noted and in this fourth edition the extensions have been made. Also a few main subdivisions have been added. No changes in the assigned numbers have been made.

Copies of many of the index cards mentioned above have been furnished the Western Society of Engineers and may be found on file in the rooms of that society, 1734 Monadnock Block, Chicago, Illinois.

Mechanical Engineering Department, University of Illinois.

April 1904.

PREFACE TO THE THIRD EDITION

THE present edition of the Extension of the "Dewey Decimal Classification" differs from the second edition in several important particulars.

There has been added, with slight modification, the extension relating to railroads and railroad engineering adopted by the International Railway Congress. The subdivisions of Mechanical Engineering relating to shop practice have been more fully extended and have been placed under the main division 621.7: and the subdivisions under 621.8, "Machinery of Transmission," have been revised. There are minor changes too numerous to note. It is recognized that the arrangement of subdivisions is still far from perfect as regards relative importance and logical sequence; however, it is believed that in this respect the present edition is a marked improvement over previous editions.

The engineer will find the decimal classification useful in the indexing of catalogs, notes and memoranda, clippings, and articles in technical journals. For catalogs, drawings, and books, only the main subdivisions should be used; but for card indexes of technical literature the most minute subdivisions will be found necessary. For the guidance of those who use this extension in connection with a card index, a sample card is shown on the preceding page. The Dewey number 621.63 serves to locate the card, and the remaining notes in the margin indicate the periodical, volume, page, and date. Thus the paper in question is found in the Proceedings of the Institution of Mechanical Engineers, Vol. 123, page 272, of date December, 1895, it occupies 55 pages and contains 31 illustrations. The list of engineering periodicals with their abbreviations includes the more noteworthy journals and proceedings devoted wholly or in part to mechanical engineering or railway engineering.

Mechanical Engineering Department, University of Illinois

April, 1901.

CLASSES

USED IN THE

DEWEY DECIMAL CLASSIFICATION.

- 00. General Works.
- 100. Philosophy.
- 200. Religion.
- 300. Sociology.
- 400. Philology.
- 500. Natural Science.
- 600. Useful Science.
- 700. Fine Arts.
- 800. Literature.
- 900. History.

AN EXTENSION
OF THE
DEWEY DECIMAL CLASSIFICATION

379 Education.

380 Commerce. Communication.

385 Railways from the Economic and Financial Point of View.

385.0 General Works.

(Compends, Essays, Periodicals, Societies, Reports, Statistics, History.)

385.1 Railways from the Financial Point of View.

385.2 Competition of Railways and Steamship Lines.

385.3 State Control of Railways.

385.4 Administrative Organization of Railways.

385 5 Personnel.

(Relations of Railroads to Employees, Etc.)

385.6 International Convention relative to Railroads.

385.7 Interstate Commerce Commission.

386 Canals and Highways from an Economic Aspect.

387 River and Ocean Transportation.

388 Rapid Transit in Cities.

389 Weights and Measures.

510 Mathematics.

511 Arithmetic. 512 Algebra. 513 Geometry. 514 Trigonometry.
515 Descriptive Geometry and Projection. 516 Analytical Geom-
etry. 517 Calculus. 519 Probabilities.

520 Astronomy.

530 Physics.

531 Mechnicas.

- .1 Pure Motion. Kinematics.
- .2 Statics. Graphic Statics.
- .21. Force and Its Me sure.
(Traction dynamometers, weighing scales, etc.)
- .3 Dynamics. Kinetics.
- .4 Work. Friction.
(Friction brakes. Transmission and absorption dynamometers.)
- .5 Gravity.
- .6 Conservation of Energy.
- .7
- .8 Machines. Transmission of Force.
- .9 Tables. Problems. Questions.

532 Liquids. Hydrostatics. Hydraulics.

- .5 Liquids in Motion. Flow in Pipes, Channels Etc.

533 Gases. Pneumatics.

- .1 Properties of Gases and Vapors.
- .2 Laws of Compressibility.
- .3 Atmosphere.
- .6 Aeronautics.
- .7 Kinetic Theory of Gases.

534 Sound. Acoustics.

535 Light. Optics.

536 Heat.

- .1 Theory. Nature.
- .2 Communication.
- .3 Action of Bodies on Heat.
- .4 Effect. Action of Heat on Bodies.
- .5 Temperature. Measurement of, etc.
- .6 Calorimetry.
- .7 Thermodynamics.

- 536.71 The Perfect Gases.
- .72 The Vapors.
- .73 Thermodynamics of the Steam Engine and other Heat Motors.
- .8 Applications.
- .9 Tables. Problems. Questions.

537 Electricity.

- .1 Theory. Nature.
- .2 Statical.
- .3
- .4 Atmospheric. Lightning Rods.
- .5 Dynamical.
- .6 Electro Dynamics.
- .7 Electrical Measurements.
- .8 Applications.
- .81 Telegraph.
- .82 Telephone. Microphone.
- .83 Dynamos. Electric Lighting.
- .84 Transmission of Power. Storage.
- .85 Electro-Metallurgy.
- .86 Galvanometers.
- .87 Medicine.
- .88 Electric Signals.

538 Magnetism.

539 Molecular Physics.

- .1 Theory. Molecular Structure.
- .2 Properties of Solids.
- .3 Elasticity. Torsion.
- .4 Strength of Materials.

(See also 620.1. General theory should go under 539.4; tests and results of tests, under 620.1.)

540 Chemistry.

620 Engineering.

(.01 Statistics; .02 Quantities and Costs; .03 Contracts and Specifications; .04 Design and Drawing; .05 Executive; .06 Working and Maintenance; .07 Laws; .08 Patents; .09 Reports.)

620.1 Strength of Materials. (See also 539.4)

.2 Compendis.

.3 Dictionaries.. Cyclopedias.

.4 Essays.

.5 Periodicals.

.6 Societies.

.7 Study and Teaching.

.8 Tables and Calculations.

.9 History of Engineering.

621 Mechanical Engineering.

(.01 Statistics; .02 Quantities and Costs; .03 Contracts and Specifications; .04 Designs and Drawings; .05 Executive; .06 Working and Maintenance; .07 Laws; .08 Patents; .09 Reports)

621.1 Steam Engineering.

.1 Power Plants: Central Stations.

.101 Descriptions of.

.11 Mechanism of Steam Engine. Design of Engine Parts.

.111 Reciprocating parts. Counterbalancing.

.112 Shafts and journals. Bearings.

.113 Fly-wheels.

.114 Cylinder, bed, etc.

.115 Governors.

.116 Valves and valve gears.

(See also 621.84. Under 621.116 put matter on the design and construction of steam engine valves; under 621.84 the Kinematic analysis of valve mechanisms.)

.119 Miscellaneous devices. Oiling devices, safety attachments, etc.

.12 Marine Engines and Ship Propulsion.

.13 Locomotives.

.130 Generalities.

(.1305 Periodicals; .1306 Societies; .1309 History.)

.131 Theory of the Locomotive.

.1311 Adhesion. Tractive force. Horsepower.

.1312

.1313 Tests

.132 Types of Locomotives.

.133 Locomotive boilers. Production of steam.

.1331 Combustion. Fuels. Petroleum. Fuel consumption.

.1332 Grate and ash pit. Firebox. Stays.

.1333 Shell and tubes.

.1334 Smokebox and stack.

.1335 Exhaust pipe.

.1336 Dome and throttle.

- 621.1337 Boiler feeding. Pumps, injectors. Purification of water.
 Scale prevention.
- .1338 Miscellaneous fittings. Gauge cocks, safety valves, etc.
- .134 Engine of the locomotive.
- .1341 Driving mechanism. Cylinders, pistons, rods, cranked
 axles, etc.
- .1342 Steam distribution. Slide valves.
- .1343 Special types of valves and valve gears.
- .1344 The compound principle. Distribution in compound lo-
 comotives.
- .1345 Lubrication of locomotive.
- .135 Running gear.
- .1351 Frames. Frame plates. Transverse bracing, attach-
 ments to boiler, etc.
- .1352 Wheels, boxes, and axles. Disturbances. Counterbal-
 ancing.
- .1353 Suspension. Springs, saddles, equalizing levers, etc.
- .1354 Trucks. Bissell trucks, four-wheel trucks, etc.
- .1355 Locomotive brakes.
- .136 Tenders.
- .1361 Design of, weight of, brakes, etc.
- .1362 Coupling arrangements.
- .1363 Taking water without stopping; track tanks; water
 scoops.
- .137 Management of locomotive. Engineer's and fireman's
 duties. Assignment of crews, etc.
- .138 Maintenance and repair of locomotives.
- .1381 Round houses.
- .1385 Locomotive repair shops.
- .139 Supplies. Materials.
- .14 **Traction Engines (agricultural, road roller, etc.)**
- .15 **Portable Engines.**
- .16 **Stationary Engines.**
- .161 Throttling engines.
- .162 Automatic shaft governor engines.
- .163 Releasing gear engines (Corliss, etc.)
- .164 Single acting engines of Westinghouse or Willans type.
- .165 Steam turbines.
- .166 Rotary engines.
- .167 Hoisting engines, hauling engines, dredge engines, and
 other special types.
- .17 **Steam Economy.**
- .171 Instruments and apparatus used in boiler and engine tests.
 Indicators, counters, dynamometers, gauges, etc.
- .172 Records and results of engines tests. Measurement of
 power; efficiency, engine friction, etc.
- .173 Records and results of tests on miscellaneous steam
 apparatus.
- .174 Theory: Expansion, superheating, cylinder condensation,
 jacketing, etc. (See also 536.73.)

- 621.175 Condensers and cooling towers.
- .1751 Surface condensers.
- .1752 Jet condensers.
- .1753 Cooling towers.
- .176 Injectors and ejectors.
- .177 Steam separators.
- .178 Accidents, engine failures, fly-wheel failures, boiler ex-
 plosions.
- .179 Management of engines and boilers, engineroom, boiler
 room, etc.
- .18 **Steam Generation. Boiler. Furnace.**
- .181 Steam boilers.
- .1811 Marine steam boilers.
- .1812 Locomotives, traction, and portable boilers.
- .1813 Stationary internally fired.
- .1814 Stationary externally fired.
- .1815 Stationary water tube and sectional boilers.
- .1817 Boiler plants. Descriptions of, or designs of.
- .182 Fuels. Comparative efficiency of, etc.
- .183 Boiler fittings: Safety valves, water gauges, cocks, man-
 holes, etc..
- .184 Furnace fittings. Appliances connected with combustion
 of fuel.
- .1841 Mechanical stokers.
- .1842 Forced draft apparatus.
- .1843 Chimneys.
- .1844 Smoke consumption and prevention.
- .1845 Oil feed apparatus, burners, etc.
- .1846 Coal and ash conveyors.
- .1849 Miscellaneous appliances.
- .185 Construction and setting of boilers.
- .1851 Riveted joints.
- .1852 Staying and bracing of boilers.
- .1853 Governing proportions.
- .1854 Setting and hanging of boilers.
- .186 Steam transmission and distribution.
- .1861 Theory of flow of steam: Condensation, friction, etc.
- .1862 Central station distribution.
 Steam fittings, piping, valves, coverings, traps, steam-loops
 pressure regulators, packings, etc.
- .187 Boiler economy. Boiler tests.
- .1871 Feed water heaters, purifiers, economizers, etc.
- .1872 Inspection of boilers.
- .1873 Incrustation and corrosion.
- .1874 Wear and tear of boilers.
- .19 **Steam Heating.** (See 697)

621.2 **Water Engines or Motors.**

General Theory of Hydraulics. (See 532)

.21 **Water Wheels:**

- 621.22 Overshot and breast wheel.
- .23 Undershot wheel.
- .24 Turbines.
- .241 Outward flow turbines.
- .242 Inward flow turbines.
- .243 Downward flow turbines.
- .25 Water pressure Engines.
- .26 Hydraulic Presses.
- .27 Hydraulic Ram.
- .28 Hydraulic Machinery.
- Hydraulic elevators, hoists, riveters, forging machines, etc. Also hydraulic devices used in steel works of like character.
- .29 Mill Dams, Sluices, etc. (See 627)

- 621.3 Electrical Engineering.
- .30 Electric Power Plant.
- .31 Dynamo Machines.
- (Including electric motors.)
- .32 Electric Lighting.
- .33 Electric Railways.
- .34 Transmission of Electric Force.
- .35 Storage of Electric Force.
- .36 Application to driving Machine Tools.
- .37 Application to driving Hoisting Machinery.
- .38
- .39

- 621.4 Air and Gas Engines and Other Motors.
- .41 Caloric Engines.
- .42 Compressed Air Engines.
- .43 Ignited Gas Engines.
- .431 General theory of gas or gasoline engines.
- .432 Four-cycle gas or gasoline engines.
- .433 Two-cycle gas or gasoline engines.
- .434 The Diesel motor.
- .435 Tests of gas engines.
- .436 Gas producers.
- .44 Binary Vapor Engines.
- .45 Windmills.
- .46 Animal Motors. Tread Mills.
- .47 Solar Engines.
- .48 Oil Engines.
- .49

621.5 Air Compression. Ice Machines. Refrigeration.

- .51 Dry Air Compressors.
- .52 Wet Air Compressors.
- .53 Compressed Air Transmission and Distribution.
 - .531 Description of transmission.
 - .532 Details of transmission.—Piping, mains, gauges, etc.
Designs of transmissions.
 - .533 Records of tests on air compressors and transmissions.
 - .534 Theory of air compression (thermodynamics of). Loss of
pressure in pipes, etc. Efficiency of compressors;
Reheating, etc.
- .54 Applications of Compressed Air.
 - .541 Air motors.
 - .542 Pneumatic tools; drills, hammers, etc.
 - .543
 - .544 Special applications in railroad service.
 - .545 Pumping by compressed air.
 - .546 Compressed air locomotives.
 - .549 Miscellaneous applications.
- .55 Refrigerating Machines.
 - .552 Ammonia compression machines.
 - .553 Ammonia absorption machines.
 - .554 Carbonic acid machines.
 - .555 Miscellaneous types: Air machines, vacuum machines, etc.
- .56 Refrigeration.
 - .561 Thermodynamics of refrigeration.
 - .562 Properties of refrigerating fluids.
 - .563 Refrigeration plants.
 - .5631 Brine system.
 - .5632 Direct expansion system.
 - .564 Design of refrigeration systems. Calculation of piping,
refrigerating surface, etc.
 - .565 Cold Storage. Requirements for various products; as
apples, eggs, lemons, butter, meats, etc.
- .57 Ice Making.
 - .571 Ice making plants, can system.
 - .572 Ice making plants, plate system.
- .58 Test of ice making and refrigerating machinery.

621.6 Blowing and Pumping Engines.

- .61 Piston Blowers. Blast Furnaces, Blowing Engines, etc.
- .62 Rotary Blowers.
- .63 Centrifugal Blowers.
- .64 Steam Pumps and Pumping Engines.
 - .641 Description of.

- 621.642 General theory. Design and construction.
- .643 Tests of pumps and pumping engines.
- .65 Piston Pumps.
- .66 Rotary Pumps.
- .67 Centrifugal Pumps.
- .68 Fire Engines.
- .69
- 621.7 Manufactories. Engineering Works.** (See also 670.)
 - .701 Location, shipping facilities, etc.
 - .702 Arrangements of shops. Shop buildings.
 - .703
 - .704 Organization and administration.
 - .705 Employes. Wages and Salaries. Payment of Labor.
(Conveniences for workmen; hours of work; piece work; premium plan; profit-sharing; labor unions; strikes and lockouts.)
 - .706 Accounting. Cost-keeping. Estimates.
 - .707
 - .708
 - .707
 - .71 Machine Shop.
 - .711 Arrangement of Machine shop. Location of shafting and machines.
 - .712 Equipment. (7121 Machine tools; 7122 Small tools.)
 - .713 Machine work. Methods and processes.
 - .714 Bench work.
 - .715 Erecting.
 - .716 Toolmaking. Construction of dies, jigs, etc.
 - .717
 - .718 Supplies. Materials and stock.
 - .719 Miscellaneous.
 - .72 Foundry.
 - .720 Generalities. (.7205 Periodicals; .7206 Societies; .7209 Historical.)
 - .721 General arrangement of foundry.
 - .722 Equipment of foundry.
 - .723 Molding processes. Green sand, dry sand, loam, etc.
 - .724 Machine Molding.
 - .725 Cupola practice. Mixtures of iron. Chemistry of foundry irons.
 - .726
 - .727
 - .728 Materials and supplies.
 - .729 Miscellaneous.
 - .73. Forge Shop.
 - .731 Arrangement of forge shop.
 - .732 Equipment. Forges, blowers, anvils, etc.
 - .733 Forging processes.
 - .734 Drop forging.

- .735
- .736
- .737
- .738 Materials. Supplies.
- .739 Miscellaneous.
- .74 Woodworking Shop. Pattern Shop.
- .741 Arrangement of shop.
- .742 Equipment.
- .743 Woodworking methods and processes.
- .744 Pattern making.
- .745
- .746
- .747 Preservation and storage of patterns.
- .748 Materials and supplies.
- .749 Miscellaneous.
- .75 Drafting Room.
- .751 Arrangement.
- .752 Equipment. Desks, drawing boards, etc.
- .753 Methods and processes employed in making drawings.
- .754
- .755
- .756 Blue-printing processes.
- .757 Classification and storage of drawings.
- .758 Materials and supplies.
- .759 Miscellaneous.
- .76 Other Shops or Departments.
- NOTE—The numbers 621.76 to 621.79 may be used for shops or departments of a more special character than those given above; for example, Boiler shops, Paint shops, Sales Department, etc. The subdivision of .76 to .79 may be similar to those of .61 to .64; thus, .761 Arrangements; .762 Equipment; .763 Methods and Processes; .768 Materials and supplies; .769 Miscellaneous.
- .77
- .78
- .79
- 621.8 Millwork and Machinery of Transmission. Design of Machine Parts.
- .81 Principles of Mechanism.
- .82 Journals, Shafting, etc.
- .821 Journals.
- .822 Bearings. Ball and roller bearings.
- .823 Shop shafting.
- .824 Engine and propeller shafts.
- .825 Clutches and couplings. Friction clutches.
- .83 Toothed Wheels and Cams.
- .831 Forms of teeth; tooth curves; general theory.
- .832 Design of Gears.
- .8321 Spur gears

- 621.8322 Bevel and skew bevel gears.
- .8223 Worm and spiral gears.
- .833 Efficiency of gears. Tests. Friction of gears.
- .834 Construction: Cutting and casting of gears.
- .835 Design of cams.
- .836 Chain Gearing.
- .84 Valve Motions and Gears. (See also 621.116)
- .85 Machinery and Mill Gearing.
- .852 Belt gearing.
- .853 Hemp rope transmission.
- .854 Wire rope transmission.
- .86 Hoisting and Conveying Machinery.
- .87 Cranes and Elevators.
- .871 Rotary jib cranes.
- .872 Traveling cranes.
- .873 Hydraulic cranes.
- .88 Fastenings.
- .881 Screws and bolts. Systems of screw threads. Screws for transmitting motion.
- .882 Keys and cotters.
- .883 Rivets. Design of Riveted joints.
- .89 Lubricants. Friction.
- 621.9 Machine Tools.**
 - .91 Planing Machines.
 - .911 Metal planers, shapers, and slotters.
 - .912 Wood planing machinery.
 - .92 Grinding and Filing.
 - .921 Emery Wheels.
 - .922 Cylinder and surface grinding machines.
(Lapping machines.)
 - .923 Sandpapering devices.
 - .93 Cutting and Sawing.
 - .931 Metal sawing and cutting machinery.
 - .932 Wood sawing machinery.
 - .94 Turning and Milling.
 - .941 Metal turning lathes.
 - .942 Wood turning lathes.
 - .943 Milling machinery.
 - .944 Pipe threading machines.
 - .95 Perforating machinery. Drills.
 - .951 Drills.
 - .952 Drilling machinery.
 - .953 Wood boring machinery.
 - .954 Reamers.

- 621.96 Punching and Shearing Machinery.
- .97 Hammers. Nail and Rivet Machinery.
- .98 Bending, Straightening and Shaping.
- .981 Bending Machinery.
- .982 Straightening machinery.
- .983 Flanging and die press machinery.
- .99 Screw Machines. Bolt and Nut Machinery, etc.
- 622 Mining Engineering.**
- 623 Military and Naval Engineering.**
- 624 Bridges and Roofs.**
- 626 Railroad and Road Engineering.**
 - .1 Route. Roadbed and Track.
 - .11 Location and Survey.
 - (Preliminary surveys. Profiles. Grades and curves. Computation of earthwork)
 - .12 Subgrade (Earthwork, Drainage, etc.)
 - .13 Bridges and Tunnels. Ventilation of Tunnels.
 - .14 Track.
 - (.141 Ballast; .142 Cross-ties; .143 Rails and rail-joints; .144 Track-laying.)
 - .15 Equipment of Track.
 - (.151 Switches; .152 Crossings; 153 Junctions; .154 Turntables; 156 Transfer tables.
 - .16 Secondary Equipment.
 - (Fences, cattle-guards, snow-sheds, section-houses, etc.)
 - .17 Maintenance of Way. Repairs and Renewals.
 - .18 Supplies. Track Materials.
 - .19 Other Topics.
 - 625.2 Rolling Stock. (For Locomotives, see 621 13.)
 - .205 Periodicals; 206 Societies; (Am. Ass. of Master Car Builders.)
 - .21 Cars and Carriages. Principal Parts of,
 - .211 Frames.
 - .212 Axles. Wheels. Tires. Balancing of wheels.
 - .213 Suspension.
 - .214 Provisions for lubricating. Lubricants.
 - .215 Trucks. Radial and convergent axles.
 - .216 Couplers and buffers. Draft gears.
 - .22 Cross Section of Cars. Clearance of Bridges and Tunnels. Influence of Length of Cars on Curves.
 - .23 Passenger Cars.
 - .230 Types and comparison of types. Seating capacity. Weight.
 - .231 Compartment cars.
 - .232 Corridor or vestibuled cars. Parlor cars. Sleeping cars. Dining cars, etc.

- 625.233 Lighting of cars.
- .234 Heating and ventilation of cars. Sanitation.
- 24. Freight Cars.
- .240 Generalities. Capacity. Weight.
- .241 Flat cars.
- .242 Hopper and dumping cars.
- .243 Closed and covered cars.
- .244 Refrigerator cars.
- .245 Special cars. Dynamometer cars. (See 656.221)
- .246 Details of construction. Use of steel in construction.
- .247 Car unloaders. Miscellaneous unloading and dumping devices.
- .25 Brakes. Hand, automatic, continuous, etc. Air Brakes.
- .26 Car Repair Shops.
- .27 Supplies. Materials.

625.3 Inclined and Mountain Railways.

- .4 Elevated and Underground Railways. Subways.
- .5 Cable Roads.
- .6 Tributary Railways or Feeders. Street Railways.
- .61 Tributary Railways from a Technical Standpoint.
 - .611 Traffic; taxes; .612 Administration and operation; 613 Sub-grade; .614 Track and track equipment; 615 Stations; .616 Motive power; 617 Rolling stock.
- .62 Street Railways. Tramways.
- .7 Roads. Highways.
- .8 Pavements.
- .9 Ship Railways.

626 Canal Engineering.

627 River, Harbor, and General Hydraulic Engineering.

628 Sanitary Engineering.

650 Communication. Commerce.

- 651 Office Equipment and Methods.
- 652 Writing. Materials; Typewriters.
- 653 Stenography.
- 654 Telegraphy.
- 654.6 Telephones.
- 655 Printing and Publishing.

656 **Transportation. Operation of Railways.**

656.1 **Transportation on Roads and Highways.**

.2 **Transportation by Railways.**

.21 **Railway Terminals and Stations.**

- .211 Arrangement of passenger stations.
- .212 Arrangement of freight and terminal stations.
- .213 Stations for special purposes, (coal, live stock, etc.)
- .214 Union stations. Division of expenses.
- .215 Heating and lighting of stations.

.22 **Trains**

- .221 Train resistance.
- .2210 General theory of train resistance.
- .2211 Resistance of freight trains.
- .2212 Resistance of passenger trains.
- .2213 Resistance of engines.
- .2214 Resistance on electric roads.
- .2215 Resistance of foreign rolling stock.
- .2216 Air resistance.
- .2217 Dynamometer cars.
- .222 Running of trains. Schedules.
- .223 Use of and distribution of rolling stock.
 (2231 Passenger cars; 2232 Freight cars; Return of empty cars
 Interchange of cars.)
- .224 Passenger train service. Postal service.
- .225 Freight service. Making up trains. Tonnage rating.
- .226 Baggage service.
- .227 Transportation of dangerous and perishable freight.
- .228
- .229 Military transportation.

.23 **Traffic and Rates.**

- .231 Transportation tolls and rates in general.
 (Revision of rates. Basing rates. Differential rates. Zone
 tariffs, etc.)
- .232 Cost of transportation.
- .233 Competition of railways. Division of traffic. Pools,
 agreements, etc.
- .234 Passenger rates. Rates for baggage, dogs, etc. Passes
 and reduced fares.
- .235 Freight rates. Classification of freight.
- .236 Rates for transportation other than by railway.
 Rates of portorage and drayage. Steamer rates. Street railway
 rates.
- .237 Accounting and auditing. Supervision of receipts and
 expenses.

.24 **Damage. Delays. Claims. Responsibility.**

.25 **Safety appliances.**

- .250 General rules.
- .251 Signals in general. Forms. Colors. Sounds. Daltonism.
- .252 Hand signals. Train signals.

- 656.253 Fixed track and station signals.
- .254 Apparatus for long-distance communication. Bells and special warning signals. Telegraph. Telephone. Communication between stations and running trains. Various operating systems. Train dispatching. Protection of trains in distress.
- .255 Staff and ticket system of controlling trains.
- .256 Block system.
- .2561 Simple manual block signals.
- .2562 Electrically controlled manual block signals.
- .2563 Automatic electric block signals.
- .2564 Automatic pneumatic block signals.
- .257 Centralization of operation of switch and signal systems. Interlocking switch and signal apparatus. Electro-pneumatic interlocking devices.
- .258 Indirect blocking systems. Electric slot. Ring and key. Locking of draw-bridges.
- .259 Other safety devices.
(Apparatus placed in trains. Communication between cars and with locomotive. Speed indicators on trains or along the track.)
- .26 Accessories to Railway Service. Dray and Cab Service. Buffets, Restaurants and Hotels.
- .27 Operation of Lines with light Traffic and of Local and Tributary Railways.
- .28 Accidents.
- .280 Statistics. General questions.
- .281 Derailments.
- .282 Broken couplings. Runaway cars.
- .283 Collisions.
- .284 Other accidents.
- .285 Accidents to railway employees.
- .296 Accidents to the public upon railway property.
- .29 Miscellaneous Questions relative to Railway Transportation.

656.3 Transportation by Horseless Vehicles.

- .30
- .31
- .32 Automobiles.
- .321 Types of Automobiles.
- .322 Motive powers.
- .323 Principal parts.
(Running gear, motors, transmitting gear, breaking devices.)
- .324 Design and construction of automobiles.

657 Book-keeping. Accounting.

658 Business Manuals. Methods. Tables.

659 Advertising and Other Topics.

660 Chemical Technology.

662 Pyrotechnics. Explosives.

665 Oils. Gases.

.2 Animal Oils and Fats.

.3 Vegetable Oils and Fats.

.4 Mineral Oils. Paraffin. Petroleum. Kerosene.

.5 Illuminating Gases.

.8 Other Gases.

666 Ceramics. Glass, etc.

669 Metallurgy and Assaying.

.1 Iron and Steel.

(Blast furnace practice, Bessemer and open-hearth processes, etc.)

.2 Gold and Silver.

.3 Copper.

.4 Lead.

.5 Zinc.

.6 Tin.

.8 Fuels and Furnaces.

.9 Assaying.

670 Manufactures.

(In this division may be placed items that do not properly belong under 621, such as items relating to textile mills or machinery the manufacture of shoes, etc.)

680 Mechanic Trades.

690 Building.

691 Materials. Processes. Preservatives.

692 Plumbing, Gas and Steam-fitting, etc.

697 Heating and Ventilation.

- .3 Furnaces.**
- .4 Hot Water, High and Low Pressure.**
- .5 Steam, High and Low Pressure.**
- .5 Gas. Coal Gas. Water Gas. Natural Gas.**
- .7 Electric and Other Methods.**
- .9 Ventilation. Air Ducts. Conduits. Fans.**

699 Car and Ship Building.

720 Architecture.

721 Architectural Construction.

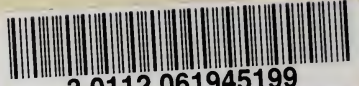
(.1 Foundation; .2 Walls; .3 Piers, columns; .4 Arched construction; .5 Roof-; .6 Floors and flooring; .7 Ceilings; .8 Doors, gates, grills, windows; .9 Iron and composite structures.

740 Drawing. Decorations. Design.

(741 Freehand; 742 Perspective; 744 Mathematical and Scientific Drawing.)

760 Engraving.

770 Photography.



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